REMARKS

This Amendment, filed in reply to the Office Action dated December 31, 2007, is believed to be fully responsive to each point of objection and rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1-5, 15, 21 and 22 are rejected. Claims 12-14 are allowable. Claims 1, 6, 9, 11, 14, 26 and 27 are amended herewith. The amendments to Claims 6, 9, 11, 14, 26 and 27 are solely editorial in nature. Support for the amendment to Claim 1 can be found throughout the specification, and at, for example, page 2, lines 8-9, of the specification as filed. Claims 24 and 25 are canceled herewith without prejudice or disclaimer. Upon entry of this amendment, Claims 1-18, 20-23, 26 and 27 will be all the claims pending in the application. No new matter is added by way of this amendment. Entry and consideration of this amendment are respectfully requested.

Withdrawn Rejections

Applicants thank the Examiner for withdrawal of the rejection of Claims 4 and 10 under section 112, second paragraph, and for withdrawal of the rejection of Claims 1-5, 12-13, 15 and 21-25 under 35 U.S.C. 102(b). Applicants also thank the Examiner for acknowledging the allowance of Claims 12-14.

Claims 1-5, 15, 21 and 22 are Adequately Described Under 35 U.S.C. § 112

On page 2 of the Office Action, Claims 1-5, 15, 21 and 22 are rejected under 35 U.S.C. 112, first paragraph, for allegedly lacking an adequate written description.

The Office asserts that the specification discloses the structure of only a few representative species of redox centers, and that the specification fails to describe any other representative species by any identifying characteristics or properties other than by redox activity. The Office concludes that one of skill in the art would not understand Applicants to be in possession of the invention as claimed.

In the interest of compact prosecution, and without acquiescing in the rejection, Applicants herewith amend Claim 1 to recite that the redox center comprises "a metal atom which is stable in different oxidation states." Support for this amendment can be found on at least page 2, lines 8-9 of the specification as filed. Applicants respectfully point out that the claims as amended recite specific structural and functional properties of the claimed redox centers, and when combined with the knowledge in the art, one of skill in the art would readily envision the members of the claimed genus. In addition, Applicants note that the specification as originally filed, at page 2, lines 8-9, discloses representative examples of the claimed redox centers. Further, Applicants note that the claimed genus of redox centers is not as broad as that asserted by the Examiner, at least because the 4-alpha-bundle consisting of SEQ ID NO: 11 consists of a specific set of residues and associated ligands which are oriented towards the cavity of the bundle in a specific configuration, and which possess no binding capability with the redox centre. One of skill in the art would readily understand that not all redox centers can be co-ordinated or otherwise bound to this configuration, and would fully understand which redox centers can be accommodated in the cavity and co-ordinated by the inward facing ligands of the bundle.

In view of the above, Applicants respectfully submit that the claims as amended are sufficiently described in the specification such that one of skill in the art would understand Applicants to be in possession of the invention as claimed.

Withdrawal of the rejection is respectfully requested.

Claims 1-5, 15 and 21-25 are Enabled Under 35 U.S.C. § 112

On page 4 of the Office Action, Claims 1-5, 15, 21-25 are rejected under 35 U.S.C. 112, first paragraph, for allegedly lacking enablement.

The Office asserts that the specification is enabling for the protein of SEQ ID NO: 11 comprising a heme redox center, however, it is asserted that the specification is not enabling for a protein of 4 α-helices of ROP (repressor of primer) comprising SEQ ID NO: 11, and any redox center.

The Office asserts that it would require an undue amount of experimentation to isolate a polypeptide possessing specific redox activity from the number of polypeptide molecules claimed, in view of the lack of guidance and working examples, and the unpredictability of determining redox activity from a protein structure.

Applicants respectfully disagree, and assert that the claims as amended are fully enabled by the specification as originally filed.

Initially, Applicants note that Claim 1 has been amended to recite that the claimed redox center comprises "a metal atom which is stable in different oxidation states." Thus, the claims as amended do not broadly recite a protein containing "any redox domain," as is asserted in the rejection.

Further, Applicants respectfully point out that the claimed 4-α-helix bundle motif formed from the α-helices of the ROP (repressor of primer) of SEQ ID NO: 11 binds a metal atom or haem moiety by axial co-ordination by the substituted residues as disclosed in the section beginning on page 2, line 15, of the specification as filed. As would be appreciated by the skilled artisan, the distinctive feature of a haem molecule that permits this geometry is the equatorial planar porphyrin ring which leaves the axial co-ordination positions of the iron atom available to interact with the ligands of the residues introduced into the helix. As shown in Figure 1B of Applicants' disclosure, the structure of the 4-α-helix bundle motif formed from the α-helices of the ROP (repressor of primer) of SEQ ID NO: 11 enables it to co-ordinate the metal atom in the opposed orientation of the ligands of these residues in the helices. Applicants also disclose that the co-ordinating residues in SEQ ID NO: 11 are the substitutions L56H and L113H, which bind to metal atoms having valence shell vacancies by well known electron pair sharing.

Accordingly, Applicants respectfully submit that the specification teaches the mechanism by which the 4-α-helix bundle motif formed from the α-helices of the ROP (repressor of primer) of SEQ ID NO:11 co-ordinates a redox centre comprising a metal atom. Using the molecular modeling approach and experimental assays described in Applicants' disclosure, one of skill in the art would readily understand which metal atoms, or molecules comprising metal atoms having redox properties, could be utilized in the present invention, without embarking on undue experimentation. By following the detailed experimental protocols in Applicants' disclosure, for example the techniques disclosed on page 8, line 21, of the specification as filed, it would be mere routine experimentation for one of skill in the art to determine which metal atoms, or molecules comprising metal atoms having redox properties, could be incorporated into the

structure of the 4-α-helix bundle motif formed from the α-helices of the ROP (repressor of primer) of SEQ ID NO:11, to practice the invention as claimed.

Accordingly, Applicants respectfully submit that undue experimentation would not be required to practice the invention as claimed, and assert that the Office's basis for rejection is inconsistent with the Court's findings in *In re Wands*[1], wherein it was held that "a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed." (Emphasis added.) Consistent with the holding in *In re Wands*, a requirement even for extensive screening does not preclude a finding of enablement. In view of the skill level and technical knowledge possessed by one of skill in the art to which the invention pertains and the detailed guidance provided by the instant specification regarding testing the redox activity and stability of novel redox center-containing proteins (See Examples 2 and 3), Applicants submit that the experimentation required for one of skill in the art to prepare the bundle motif with a redox centre comprising a metal atom to perform the claimed invention would not be undue, but merely routine.

Withdrawal of this aspect of the rejection is therefore respectfully requested.

[1] Extensive screening to isolate a claimed cell was not undue when the required methods are routine in biotechnology. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). Further, the fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. *In re Certain Limited-Charge Cell Culture Microcarriers*, 221 USPQ 1165, 1174 (Int'l Trade Comm'n 1983), aff'd. sub nom., *Massachusetts Institute of Technology v. A.B. Fortia*, 774 F.2d 1104, 227 USPQ 428 (Fed. Cir. 1985). See also *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404. The test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. *In re Angstadt*, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976). M.P.E.P. § 2164.01.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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